

## MOUNTING/DEMOUNTING BODIES OR CONTAINERS ON VEHICLES

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☐ WO9108925

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**Abstract**

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The present invention relates to a body replacement system for motor vehicles in which a support frame is provided which is attachable to or integrally formed with a vehicle chassis (10) and which carries a traction means for enabling mounting or demounting of a selected vehicle body (18) on two said support frames, suitably by winching such onto the support frame by means of a cable winch or chain drive mechanism attachable to a rear body portion. The support frame and the interchangeable rear body portion have mutually interengaging guide rails (17) or channels suitably including rollers or wheels, which may be retractable or removable when not required and secure interengaging locking means are provided on the support frame under the rear vehicle body to securely attach them to one another for normal use. The arrangement of the invention enables a single vehicle to be provided having a variety of rear body portions which are readily interchangeable.

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## (54) Mounting/demounting bodies or containers on vehicles

(57) A support frame on a vehicle chassis carries a winch system 11 for enabling mounting or demounting of a vehicle body or a container on the support frame. The support frame and the body or container have mutually interengaging guide rails 17 and interengaging locking means 16 are provided on the support frame under the body container to securely attach them to one another for normal use. The system 11 includes a fly cable 19 attached to the endless cable or chain by which the body/container may be raised or lowered from/to the ground, and a second cable 21 which may be attached to the body/container and which is associated with a clutch mechanism 23; as the body/container is pulled onto the support frame the cable 21 is paid out, with the clutch 23 disengaged. When it is desired to demount the body/container the clutch 23 is engaged and the cable 21 rewound, thus moving the body/container rearwardly. The system enables a single vehicle to be provided with body portions which are readily interengageable. It may be used for mounting/demounting containers on a railway vehicle.

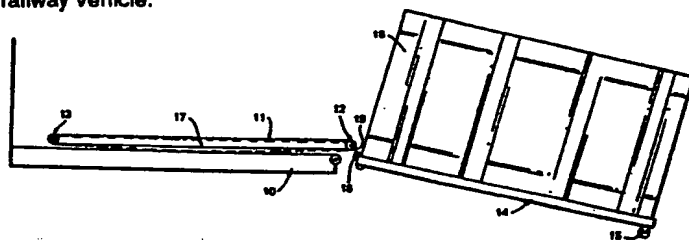


FIG. 1

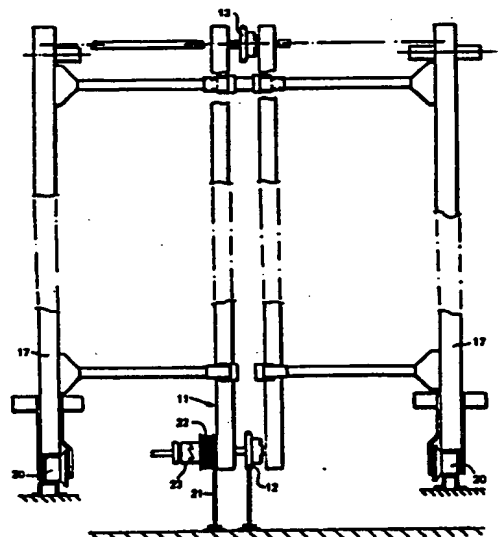


FIG. 2

At least one drawing originally filed was Informal and the print reproduced here is taken from a later filed formal copy.

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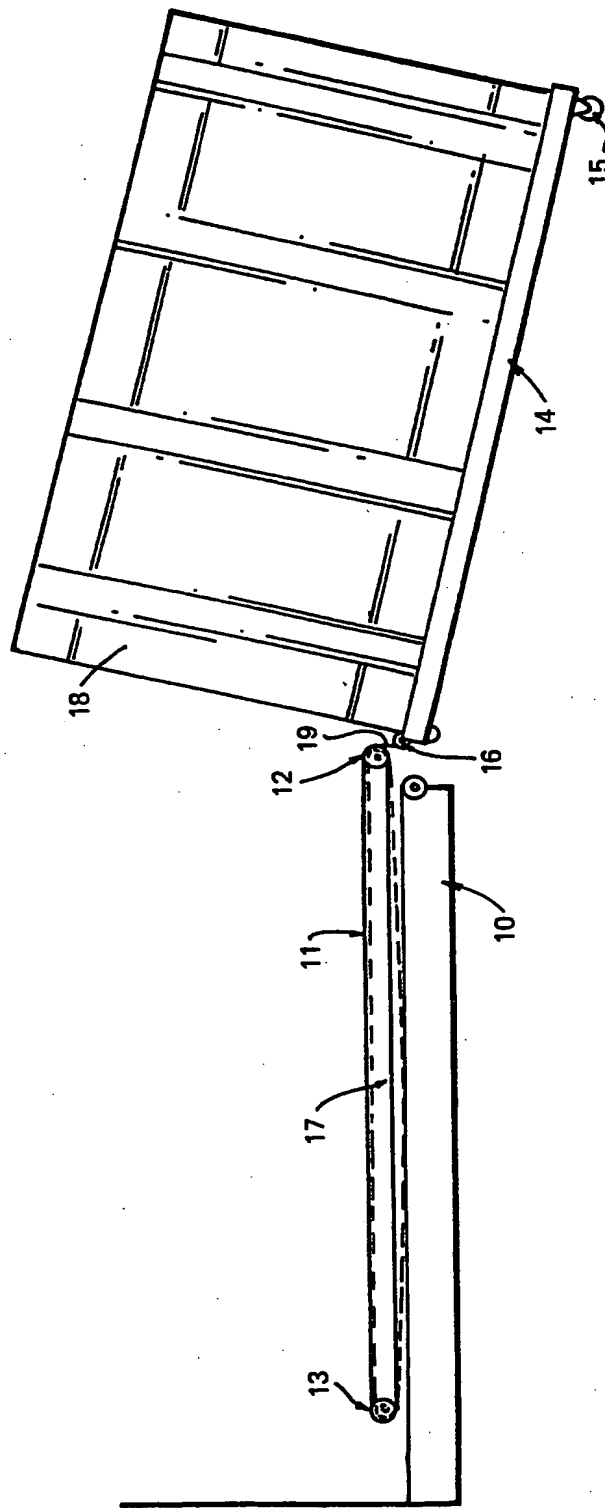


FIG. 1

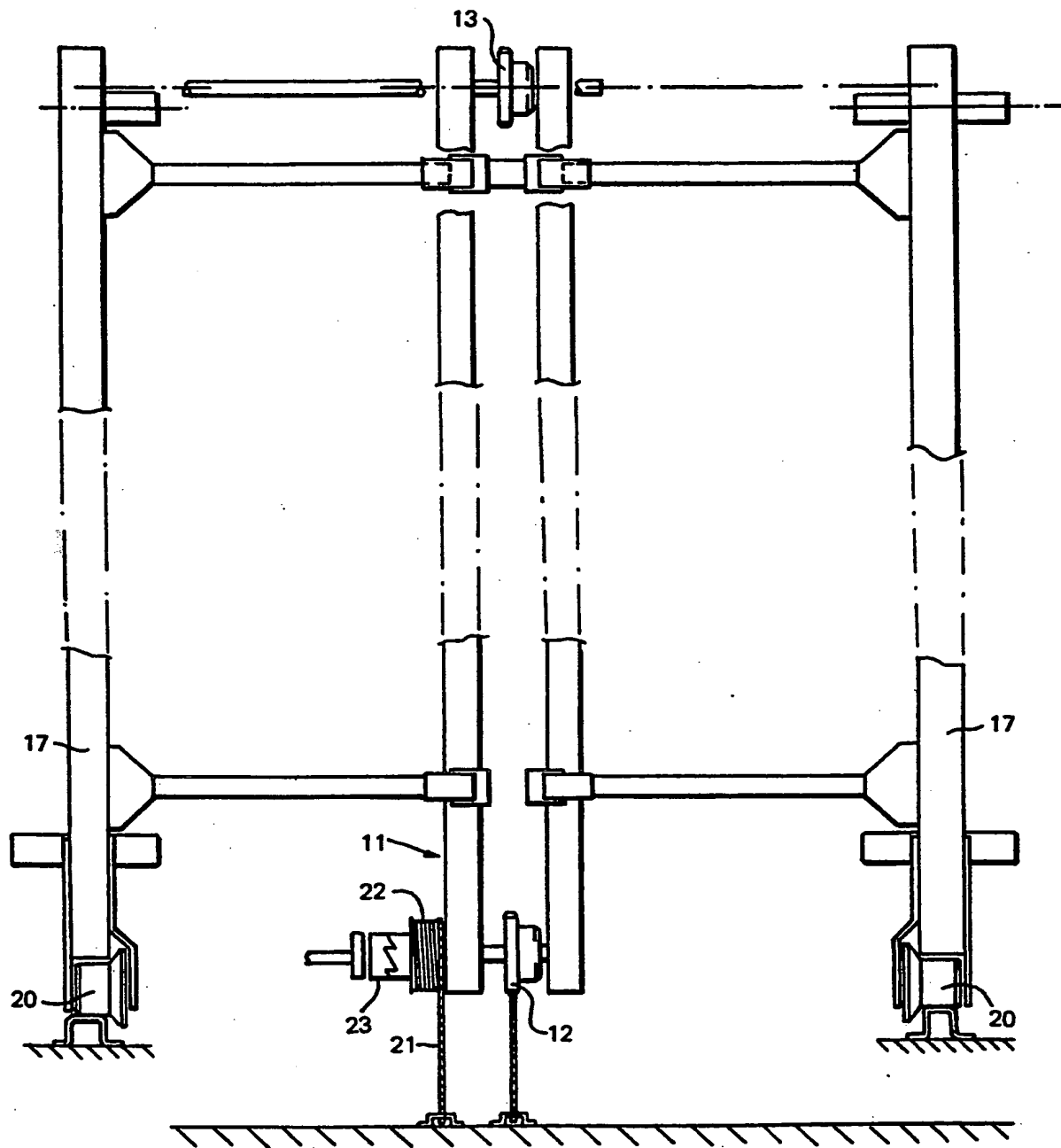


FIG. 2

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A BODY REPLACEMENT SYSTEM FOR MOTOR VEHICLES

The present invention relates to a body replacement system for vehicles, in which a variety of different body types can be provided for attachment to a goods vehicle chassis and which can be readily exchanged with a variety of body types to enable a single vehicle chassis to be utilised for a variety of purposes. In addition, the arrangement of the invention could be utilised for enabling loading and unloading of one or more appropriately adapted containers without recourse to the use of overhead cranes or the like.

At present, vehicles are manufactured having a standard front cab or driving cab and one of a variety of standard rear cab types, including for example a box-cab, a luton-cab, a flatdeck, a flatdeck with drop sides, or a tipper. In addition, a plurality of specialised rear cabs can be supplied to order. Examples of the latter include refrigerated rear cabs, bowsters and the like for liquid or bulk material, livestock carrying cabs or minibuses, to name but a few. As a consequence, since each individual body type is normally provided as an integral part of the rear portion of the vehicle, each vehicle is generally suitable only for the purpose for which it was designed. Therefore, a user of a variety of different types of vehicle would require to have a number of each vehicle type for his purposes, even though all of the vehicles may not be fully utilised at all times, but would have to be readily available when needed. Such an arrangement can involve a considerable capital outlay for a fleet user and in order to bridge such gap, many fleet users use the facility of hire companies to top up their requirements for limited periods to minimise the capital costs involved in the operation of their business. Similarly, fleet hire

companies need to maintain a wide variety of different types of vehicle to be able to fulfil the demands of their customers, and during quiet periods many of the vehicles are laid up, which does not provide a particularly good return of the capital investment in the vehicles.

With larger vehicles, this problem has been largely overcome by the use of articulated vehicles, in which a separate trailer and tractor unit are provided, so that the tractor unit can be detached from the trailer and may then be coupled to an alternative trailer, according to requirements. However, such a solution has not been applied to mid-range types of commercial or goods vehicles for reasons of cost.

Demountable backcabs are known in the caravan art, in which the accommodation portion is provided with legs, which can be lowered, or attached, so that the accommodation portion can be detached from the driving cab, which may then be utilised as a small pick-up vehicle or the like. However, this principle has not been extended, to any large extent to commercial vehicles, due to the fact that existing arrangements have the disadvantage that they should be parked on firm level ground and be readily accessible to enable the drive cab to be backed on to the rear portion, which in itself can be a difficult job due to the accuracy required of the driver in backing onto the rear cab to ensure correct alignment. Further, when such an accommodation unit is on legs, it can provide an obstruction, particularly since it cannot be readily moved without its drive cab being reattached.

Examples of some prior art arrangements are shown in British Patent Nos. 102828, 1169911 and 2181715, all of which disclose arrangements for

enabling loading and unloading of load platforms onto vehicles, but each of which requires the use of a tipper frame on the chassis of the vehicle combined with winches, the tipper frame being required to enable unloading of the load platform, utilising the weight of the platform itself, the incline also enabling the load platform to be pulled up the incline during loading and subsequently lowered into position. Whilst such an arrangement provides a workable system, such requires the provision of a tipper frame to be provided on the vehicle chassis, which unnecessarily increases the cost of the vehicle chassis, since for a large percentage of the uses to which the vehicle could be put may not require the provision of a tipping mechanism.

It is the object of the present invention to provide a demountable body system for motor vehicles, particularly goods vehicles, which overcomes the disadvantages of prior art arrangements and provides for the convenient and cost-effective use of a variety of vehicle body types.

According to the present invention there is provided a vehicle body exchange system for commercial or goods vehicles, comprising a support frame attachable to or integrally formed with a vehicle chassis, means for enabling mounting or demounting of a rear body onto or from said support frame and means for securely attaching said rear body to said support frame, characterised by the feature that said mounting/demounting means comprises a chain or cable winch mechanism including a first intermediate coupling member for enabling, either an initial lifting operation during a mounting of a vehicle body on the support frame, or a final lowering operation during demounting of a vehicle body, and that a second coupling member is provided for enabling the rearward

displacement of the rear body to enable demounting thereof.

Preferably, the support frame comprises at least two guide rails or channel sections for receiving and guiding corresponding channels or guide rails of the selected rear body, and rollers or wheels may be provided in said guide rails or channels of said support frame or of the selected rear body, to enable the selected rear body to roll smoothly on the support frame, during mounting or demounting operations.

The traction means may comprise either a cable or chain drive system provided with suitable gearing and mounted on the support frame, such being driven by any appropriate means, for example by hand-winch, or electric or hydraulic motors, according to the availability of suitable power supplies. The mounting/demounting means preferably takes the form of an endless chain mechanism having a first intermediate coupling member in the form of a fly-cable attached to the chain, the length of which is at least that of the distance from the support frame from the ground level, combined with secondary coupling means, preferably utilising a cable wound on a drum driven by the chain drive mechanism via a dog clutch. Such secondary coupling means being provided for enabling a rear body to be rearwardly displaced on the support frame during a demounting operation.

The present invention will now be described further with reference to the accompanying drawings, in which:-

Fig. 1 illustrates an arrangement according to the present invention; and



Fig. 2 illustrates the mounting/demounting means including the winch mechanism.

Referring firstly to Fig. 1, which is a schematic drawing illustrating the principle of the apparatus of the present invention, a vehicle chassis 10 is shown upon which is mounted a mounting/demounting winch system 11 comprising a traction means in the form of a chain or cable extending from the rear portion of the vehicle chassis to a forward portion between guide rails or channels 17 secured to the vehicle chassis 10. The traction means is preferably an endless chain driven electrically or hydraulically, but also possibly by means of a hand winch, if a suitable power supply is not available, said chain passing over end sprockets or pulleys 12 and 13 secured to the support frame mounted on the chassis 10. The removable rear body 18 is provided with corresponded guide rails or channels 14 for slidably engaging the channels or rails 17 provided on the vehicle chassis. In addition, at the rear end of the rear vehicle body a rear roller 15, which may be detachable or retractable, is preferably provided to enable the rear body 18 to roll over the ground surface during mounting or demounting of the rear body. At the forward end of the rear body 18 a coupling arrangement 16 is provided, firstly for enabling connection of a coupling from the chain traction mechanism to be connected for raising and lowering the rear body onto the support frame, and secondly, for enabling such to be securely affixed at the forward end when positioned on the support frame ready for use.

Referring now to Fig. 2, the guide rails 17 and rear rollers 20 can be seen, between which the mounting/demounting winch system 11 comprising front and rear drive sprockets or pulleys 12 and 13 over

which runs the endless chain or cable driven thereby, is provided. To the endless cable or chain is connected a fly-cable 19 (see Fig. 1) the length of which corresponds to at least the height of the support frame above ground level and is preferably slightly longer to enable an amount of slack to be provided for coupling and uncoupling purposes. In addition, a second coupling to the rear cab 18 is provided, to which a cable 21 is attached, which is wound onto a drum 22, associated with a dog clutch 23 mounted on the drive shaft of rear sprocket or pulley 12. This second cable 21 is attached to the forward end of the rear body following initially lifting on of the forward end of the rear body onto the guide rails 17, and as the rear body 18 is pulled onto the support frame, the cable 21 is paid out, with the dog clutch 23 disengaged. For demounting the rear body, the dog clutch 23 is engaged and driven rearwardly together with the drive chain mechanism, the cable 21 acting to pull the vehicle body rearwardly and is then disengaged to enable the rear body to be lowered from the support frame by the fly-cable 19, attached to the drive chain and when the rear body has been lowered to the ground, the fly-cable is disconnected, the cables then can be secured and the vehicle may then be driven off, for example to collect an alternative rear body.

The rear body 18 is provided with additional rollers at the forward end of the guide channels 14 to enable such to be manoeuvred to a limited extent, and indeed the provision of the guide rails or channels on the lower portion of the rear body 18 enables access for the forklift truck or the like, to enable such to be moved, for example within a vehicle depot or the like. Further, such a facility enables the body portions to be stored in a space saving manner, which can be particularly important where space is at a

premium. Thus, a single tractor or drive unit can be utilised with a variety of bodies, thereby minimising capital costs in a fleet situation.

Whilst the arrangement is designed to enable the vehicle body to be picked up from and lowered onto the ground, the system could equally be utilised with loading bays in which the vehicle body is already positioned at or near the appropriate height for loading onto the rear support frame of the vehicle, in which case the winch action would operate in a similar manner as described above, but would merely pull the rear body portion onto the support frame. It will be appreciated that a wide variety of rearbodies can be provided, including specialist vehicles. For additional security, particularly with heavy rear units, for example, incorporating tipper units or even a concrete mixer or compressors or bowzers which can be relatively heavy, then additional securing means may be provided, particularly in the front portion of the rear body which could be locked onto the vehicle chassis or sub-frame with a suitable locking pin or the like and, if necessary, connected up to hydraulic power take-off systems of the vehicle or electrical power supplies, as appropriate.

Whilst the invention has been described with reference to the mounting or demounting of a single rear body member to a vehicle chassis, similar mounting and demounting systems could be provided on railway goods vehicles, which could alternatively be accessed from one side, so that several of these could be provided in the form of containers, which could be offloaded laterally onto small trucks and then taken to a depot to be collected by a fleet of road vehicles adapted according to the invention, the containers then being loaded in the normal manner onto the rear of such

vehicles for local distribution. Such an arrangement avoids the very high capital outlay which would be required for a similar system utilising conventional types of containers. Similarly, such types of containers could equally be provided for loading onto the trailer of an articulated vehicle, preferably adapted as a low-loader to enable a number of such rear body portions to be transported large distances by road on such articulated vehicles and then again collected by smaller vehicles for local deliveries.

Whilst the preferred arrangement utilises an endless chain mechanism, such could be replaced by a split winch mechanism in which the two halves of the winch can be driven either in the same direction or opposite directions to enable an loading and unloading sequence to be performed, in that when the two halves of the winch are rotated in opposite directions, a loop of cable can be provided for coupling to the front of a vehicle body to be mounted on the support frame, such that, when the winch is operated to take up the loop, the front end of the vehicle body is lifted onto the rear of the support frame and then pulled up onto the support frame.

The operation of the preferred arrangement of the present invention can be summarised as follows. Firstly a vehicle is positioned in front of a rear body to be mounted and the fly-cable 19 is attached to the front of the rear body 18. The mounting/demounting chain winch mechanism 11 is activated to tighten the fly cable thereby gradually raising the front portion of the body 18 off the ground, the rear portion being allowed to roll over the ground on the rear roller 15. As the chain drive mechanism 11 continues to function, the guide rails 14 are engaged with the side rails 17, initially over the rollers 20. At this point the

secondary coupling cable 21 is attached, with the dog clutch 23 disengaged and the winch mechanism 11 continues to draw the rear body forwardly. As the coupling point of the fly-cable progresses forwardly, it also causes the rear body to gradually pivot downwardly onto the guide rails 17 lifting the rear roller 15 off the ground and the body 18 is then pulled gradually fully onto the support frame and appropriate securing means are engaged.

To reverse the process, the winch mechanism 11 is reversed and with the dog clutch 23 engaged, the cable 21 is progressively rewound back onto drum 22, displacing the rear body rearwardly and as the chain drive progresses rearwardly in concert therewith, as the centre of gravity of the rear body moves rearwardly, such progressively pivots about the rear rollers 20 under the control of the fly-cable 19, until the rear roller 15 engages the ground. The rear body 18 is progressively pulled back until such reaches a point at which the secondary coupling cable 21 can be detached and then the chain winch continues to gradually lower the front portion of the rear body to the ground, the fly-cable 19 then being disconnected to enable the vehicle to drive away.

CLAIMS

1. A vehicle body exchange system for commercial or goods vehicles, comprising a support frame attachable to or integrally formed with a vehicle chassis or mounted on a vehicle, means for enabling mounting or demounting of a rear vehicle body onto or from support frame and means for securely attaching said rear body to said support frame, characterised by the feature that the mounting/demounting means comprises a chain or cable winch mechanism (11) including a first intermediate coupling member (19) for enabling a vehicle body to be lifted from the ground or lowered to the ground during a mounting or demounting operation, respectively, and that a second coupling means (21) is provided for enabling rearward displacement of the body from the support frame to enable demounting thereof.

2. A vehicle body exchange system as claimed in claim 1, wherein the support frame comprises at least two guide rails or channel sections (17) for receiving and guiding corresponding channels or guide rails (14) of a demounting rear body (18).

3. A vehicle body exchange system as claimed in claim 2, in which rollers or wheels (20) are provided in said guide rails or channels (17) of the support frame or of the demountable rear body to enable the rear body portion (18) to roll smoothly on the support frame during mounting or demounting thereof.

4. A vehicle body exchange system as claimed in any preceding claim, in which the winch mechanism (11) is driven by either a hand winch or electric or hydraulic motors or a combination of these according to the availability of suitable power sources.

5.     A vehicle body exchange system as claimed in any preceding claim, in which locking means are provided attached either to the demountable body (18) or the vehicle chassis (10) to enable the demountable body portion to be securely attached to the vehicle, in use.

6.     A vehicle body exchange system as claimed in any preceding claim, in which rollers are provided at the rear of the support frame to facilitate mounting or demounting of the demountable body.

7.     A vehicle body exchange system as claimed in any preceding claim, wherein rear wheels or rollers (15) are provided on the demountable body to enable such to roll over the ground during mounting or demounting operations.

8.     A vehicle body exchange system as claimed in any preceding claim, in which the winch mechanism comprises an endless chain or cable drive, said first coupling means comprises a fly-cable (19) or chain attached to said endless chain or cable, said fly-cable being of a length corresponding to at least the height of the support frame above the ground level, said second coupling means comprising a second cable (21) selectively drivable via a clutch mechanism (23).

9.     A vehicle body exchange system as claimed in claim 8 in which said clutch mechanism is a dog clutch (23) mounted on a common shaft with the drive of the endless chain mechanism.

10.    A vehicle body exchange system as claimed in claim 1 in which the cable winch mechanism comprises a split winch, by means of which the two halves of the winch may be rotated in opposite directions, so that a

loop of cable can be provided for coupling to the front of a demountable body, such that when the winch is operated to take up the loop, the front end of the demountable body is lifted onto the rear of the support frame and subsequently pulled up onto the support frame.